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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/562,574

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Akio Sato

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EXAMINER

NGUYEN, HUNG D

ART UNIT

PAPER NUMBER

4118

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/562,574	Applicant(s) SATO ET AL.	
	Examiner HUNG NGUYEN	Art Unit 4118	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 27 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/10/2007;12/27/2005</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. Figures 24 and 25 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: Page 7, Par. 25, line 2 of the Specification recites "the coaxial nozzle 24" which appears to be a wrong reference. It should be "the coaxial nozzle 22".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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4. Claims 11 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 11 recites the limitation "the compressive supply" in line 1. There is insufficient antecedent basis for this limitation in the claim. It is suggested to amend to "a compressive supply" or defined a compressive supply earlier in the claim.

6. Claim 12 recites the limitation "said carrier gas" in line 3. There is insufficient antecedent basis for this limitation in the claim. It is suggested to amend to "a carrier gas" or defined a carrier gas earlier in the claim.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3, 6 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Kinoshita et al. (JP 10286687 A).

9. Regarding claim 1, Kinoshita et al. discloses a laser-clad processing apparatus for carrying out laser-clad proceeding onto a valve-seat portion of a cylinder head, the laser-clad processing apparatus comprises:

- Cylinder head holding means 23 (Fig. 1) for holding the cylinder head 22 (Fig. 1) in an inclining manner so that the central axial line of the valve seat direction

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becomes the vertical direction. (Fig. 2 and 3 shows the cylinder head 22 is in an inclining position and the valve-seat 52 is in the vertical position).

- A laser-processing head ("the laser radiation apparatus, Par. 15) for irradiating a laser beam onto a process part of the valve seat, and at the same time discharging a powdery material to the process part (Par. 29).
- Rotary means 4 (Fig. 1) which rotates around the central axial line of the valve seat in such a state that the laser-processing head is inclined with respect to the vertical direction (Par. 14).
- Powdery-material supply mean for supplying the powdery material to the laser-processing head ("the material supply discharge jet" Par. 27).

10. Regarding claim 2, Kinoshita et al. discloses the laser-clad processing apparatus wherein the cylinder-head holding means is equipped with: inclination means 3 (Fig. 1) for inclining the cylinder head between two positions, a first position at which the central axial line of an inlet valve seat becomes parallel to the vertical line and a second position at which the central axial line of an outlet valve seat become parallel to the vertical line (Fig. 2 and Fig. 3, Par. 25); and a horizontal-movement means for moving the cylinder head in the X-axis servo motor 11 (Fig. 1) direction and in the Y-axis servo motor 11 (Fig. 1) direction, which crosses with the X-axis direction perpendicularly, on a horizontal plane (Par. 26).

11. Regarding claim 3, Kioshita et al. discloses the laser-processing head comprises: laser-beam generation means for generating said laser beam; and a coaxial nozzle

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through which the laser beam passes and at the same time which discharges said powdery material ("the shielding gas nozzle", Par. 27).

12. Regarding claim 6, Kinoshita et al. discloses a laser-clad processing method for carrying out laser-clad processing onto a valve-seat portion of a cylinder head, the laser-clad processing method being characterized in that it comprises:

holding the cylinder head in an inclining manner so that the central axial line of said valve seat becomes the vertical direction (Fig. 2 and 3 shows the cylinder head 22 is in an inclining position and the valve-seat 52 is in the vertical position); supplying a powdery material along the valve-seat portion while holding a laser-processing head in an inclined manner with respect to the vertical direction and rotating it around the central axial line of said valve seat; and at the same time irradiating a laser beam to carry out laser-clad processing (Par. 28 and 29).

13. Regarding claim 11, it is inherently when you stop the compressive gas supply, the powder material is also stopped, and it is also inherently when said pressure by means of carrier gas is lower toward a predetermined value (=0) while taking a predetermined time (any time; =0) immediately before the flow stoppage.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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15. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP 10286687 A) in view of Satou et al. (US. Pat. 6,838,638 B2).

16. Regarding claim 4, Kinoshita et al. discloses all the claimed features except for the laser-beam generation means is such that a plurality of laser diode arrays are disposed, and shapes said laser beam by controlling the laser diode arrays depending on the width direction of said valve-seat portion. Satou et al., however, teaches the laser diode arrays 3 (Fig. 1) disposed and the laser beam shapes are controlled by the laser diode arrays depends on the width direction of the valve-seat portion (Col. 8, Lines 23-37). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Kinoshita et al. to add a plurality of laser diode arrays, as taught by Satou et al., for the purpose of controlling the distribution of energy in accordance with a width position of the part to be process.

17. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP 10286687 A) in view of Mihashi (JP Pat. 2891378 B2).

18. Regarding claim 5, Kinoshita et al. discloses all the claimed features except for the powdery-material supply means, while letting said powdery material flow to a predetermined flow-out opening, flow it out through the flow-out opening by means of carrier-gas pressure, thereby compressively supplying it to said laser-processing head. Mihashi, however, teach the powdery-material flow out through the space 41 (Fig. 2) by the inner discharge jet 33; the powder feed unit 19 (Fig. 1) is connected to the gas line 29 (Fig. 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Kinoshita et al. to have the powdery-

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material flow out to the flow-out opening with the gas pressure, as taught by Mihashi, for the purpose of improving the welding quality as weld metal is supplied.

19. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP 10286687 A) in view of Nagano et al. (US Pat 6,717,106 B2).

20. Regarding claim 7, Kinoshita et al. discloses all the claimed features except for the shape of the laser beam is a rectangular shape. Nagano et al., however, teaches the laser beam is a rectangular shape 16 (Fig. 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Kinoshita et al. to have a laser beam shape in rectangular, as taught by Nagano et al., for the purpose of condensing the laser beam for better melting the powder material.

21. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP 10286687 A) in view of Scalzotto (Pub. No. US 2002/0003132).

22. Regarding claim 8, Kinoshita et al. discloses all the claimed features except for the laser-processing head is rotated normally and is rotated reversely along said valve-seat portion. Scalzotto, however, teaches the laser focusing head 10 (Fig. 1) connected to the mobile element 12 (Fig. 1) of the laser machine, the mobile element can turn about an axis A/the arrow 14 (Fig. 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Kinoshita et al. to include the laser-processing head is rotate, as taught by Scalzotto, for the purpose of varying the distance between the focusing area of the laser beam and the beam nozzle.

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23. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP 10286687 A) in view of Nagano et al. (US Pat 6,717,106 B2) and further view of Fukui et al. (US Pat. 6,056,827).

24. Regarding claim 9, the combined references disclose the laser-clad processing method except for the powdery material is discharged so as to deposit concentrated within a circle whose diameter is adapted to a side of said rectangular-shaped laser beam, the side crossing with the processing development direction perpendicularly. Kinoshita teaches the spray of the powder material and Nagano et al. teaches the rectangular laser beam. Fukui et al., however, teaches the offset of the laser beam 14a (Fig. 5) to the center of the nozzle. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Kinoshita et al. and Nagano et al. to include the laser beam is on the side, as taught by Fukui et al., for the purpose of melting the powder material after it deposited to the cylinder head instead of the center of the powder.

25. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP 10286687 A) in view of Kawasaki et al. (US Pat. 5,571,430).

26. Regarding claim 10, Kinoshita et al. discloses all the claimed features except for the powder material is melted by irradiating laser beam behind the deposition center of the powdery material by a predetermined distance with respect to the development direction of laser processing. Kawasaki et al., however, teaches the powder material PF (Fig. 6) is upstream (or in front) of the laser beam LL (Fig. 6). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was

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made to modify Kinoshita et al. to have the laser beam behind the powder material, as taught by Kawasaki, for the purpose of melting the powder material within the molten pool in the processing direction.

27. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP 10286687 A) in view of Yomo et al. (JP Pat. 405311385A).

28. Regarding claim 12, Kinoshita et al. discloses all the claimed features except for before compressively supplying said powdery material, the flow volume of said carrier gas is increased; immediately before starting the flow of said powdery material, it is decreased to a steady flow volume; and immediately before the flow stoppage, the carrier gas is opened to air. Yomo, however, teaches high pressure gas inlet pipe 17 (Fig. 1) is inserted into the powder feed pipe 16 (Fig. 1) and into the transducing box 18 (Fig. 1); the pressure of the gas is reduced in the box 18 (Fig. 1) to a constant pressure, the powder is then supplied to a spraying device from a pipe 19 (Fig. 1) along with the carrier gas. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Kinoshita et al. to increase the pressure and then reduce to constant pressure before the flow of powder material, as taught by Yomo et al., for the purpose of uniform the thickness of the powder material.

Conclusion

29. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kim et al., (US Pub. 2002/0157249) teaches the method for manufacturing valve seat using laser cladding process.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG NGUYEN whose telephone number is (571)270-7828. The examiner can normally be reached on Monday-Friday, 7:30AM-5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Quang Thanh can be reached on (571)272-4982. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HUNG NGUYEN/
Examiner, Art Unit 4118

/Quang D. Thanh/
Supervisory Patent Examiner,
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